



November 28, 2005

DESIGN MEMORANDUM No. 05-37
TECHNICAL ADVISORY

TO **All Design, Operations, and District Personnel and Consultants**

FROM: /s/ Anthony L. Uremovich
 Anthony L. Uremovich
 Design Policy Engineer
 Contracts and Construction Division

SUBJECT: **Shoulder Cross Slope and Pavement Section**

REVISES: *Indiana Design Manual* Sections
 43-3.06(01), 45-1.02(05), 52-9.02(06), and 56-4.04(03);
 Figures 52-13A through 52-13X; Tables 53-1 through 53-9,
 Table 54-2A, Tables 55-3A through 55-3H

EFFECTIVE: **September 13, 2006, Letting**

I. Shoulder Cross Slope in Tangent Section

For a paved shoulder of 1.2 m (4 ft) or narrower, the shoulder cross slope should be the same as that of the adjacent travel lane. See Figure 05-37A, Paved-Shoulder Cross Slopes and Pavement Treatments, Tangent Section, With Underdrains; or Figure 05-37B, Paved-Shoulder Cross Slopes and Pavement Treatments, Tangent Section, Without Underdrains.

Indiana Design Manual Tables 53-1 through 53-9, 54-2A, and 55-3A through 55-3H have been affected by this change. The metric-units PDF versions of such tables are attached hereto. They include *Manual* headers and footers. Please print them on two-sided pages and replace the like-numbered pages in your copy of the *Manual* with them. The english-units versions are accessible from the Department's website, at

www.in.gov/dot/div/contracts/standards/dm/english/ .

Metric Units

Paved Shld. Width, w (m)	Shoulder Cross Slope	Shoulder Pavement Section
$0.6 \leq w \leq 1.2$	2% *	Same as Travelway
$w > 1.2$	2% *, for 0.6 m, then 4%	Same as Travelway for 0.6 m, then that shown in <i>IDM</i> Figure 52-13A, B, C, D, E, F, G, I, or J, as required

English Units

Paved Shld. Width, w (ft)	Shoulder Cross Slope	Shoulder Pavement Section
$2 \leq w \leq 4$	2% *	Same as Travelway
$w > 4$	2% *, for 2 ft, then 4%	Same as Travelway for 2 ft, then that shown in <i>IDM</i> Figure 52-13A, B, C, D, E, F, G, I, or J, as required

** Where the travelway tangent cross slope differs from 2%, the shoulder cross slope should match the travelway cross slope.*

PAVED-SHOULDER CROSS SLOPES AND PAVEMENT TREATMENTS, TANGENT SECTION, WITH UNDERDRAINS

Figure 05-37A

Metric Units

Paved Shld. Width, w (m)	Shoulder Cross Slope	Shoulder Pavement Section
$0 \leq w \leq 0.6$	2% *	Same as Travelway
$0.6 < w \leq 1.2$	2% *	Same as Travelway, except for PCCP travelway with HMA shoulder, that shown in <i>Indiana Design Manual</i> Figure 52-13D
$w > 1.2$	4%	That shown in <i>IDM</i> Figure 52-13A, B, C, D, E, F, G, I, or J, as required

English Units

Paved Shld. Width, w (ft)	Shoulder Cross Slope	Shoulder Pavement Section
$0 \leq w \leq 2$	2% *	Same as Travelway
$2 < w \leq 4$	2% *	Same as Travelway, except for PCCP travelway with HMA shoulder, that shown in <i>Indiana Design Manual</i> Figure 52-13D
$w > 4$	4%	That shown in <i>IDM</i> Figure 52-13A, B, C, D, E, F, G, I, or J, as required

* Where the travelway tangent cross slope differs from 2%, the shoulder cross slope should match the travelway cross slope.

PAVED-SHOULDER CROSS SLOPES AND PAVEMENT TREATMENTS, TANGENT SECTION, WITHOUT UNDERDRAINS

Figure 05-37B

II. Shoulder Cross Slope in Superelevated Section

Where a paved median shoulder is the high-side shoulder and is 1.2 m (4 ft) or narrower, it should be sloped in the same plane as the travelway. See Figure 05-37C, Paved-Shoulder Cross Slopes, Superelevated Section, With Underdrains; or Figure 05-37D, Paved-Shoulder Cross Slopes, Superelevated Section, Without Underdrains, for more-specific information.

Metric Units

Paved Shld. Width, w (m)	High-Side Shoulder Cross Slope	Low-Side Shoulder Cross Slope
$0.6 \leq w \leq 1.2$	e	e
$w > 1.2$	e for 0.6 m Closest to Travel Lane, then **	e for 0.6 m Closest to Travel Lane, then ***

English Units

Paved Shld. Width, w (ft)	High-Side Shoulder Cross Slope	Low-Side Shoulder Cross Slope
$2 \leq w \leq 4$	e	e
$w > 4$	e for 2 ft Closest to Travel Lane, then **	e for 2 ft Closest to Travel Lane, then ***

e = superelevation rate for travelway

** as outlined in Indiana Design Manual Section 43-3.06(01)

*** as outlined in Indiana Design Manual Section 43-3.06(02)

PAVED-SHOULDER CROSS SLOPES SUPERELEVATED SECTION, WITH UNDERDRAINS

Figure 05-37C

Metric Units

Paved Shld. Width, w (m)	High-Side Shoulder Cross Slope	Low-Side Shoulder Cross Slope
$0 \leq w \leq 0.6$	e	e
$0.6 < w \leq 1.2$	e	e
$w > 1.2$	**	***

English Units

Paved Shld. Width, w (ft)	High-Side Shoulder Cross Slope	Low-Side Shoulder Cross Slope
$0 \leq w \leq 2$	e	e
$2 < w \leq 4$	e	e
$w > 4$	**	***

e = superelevation rate for travelway

** as outlined in Indiana Design Manual Section 43-3.06(01)

*** as outlined in Indiana Design Manual Section 43-3.06(02)

PAVED-SHOULDER CROSS SLOPES SUPERELEVATED SECTION, WITHOUT UNDERDRAINS

Figure 05-37D

III. Shoulder Cross Slope, Partial 3R Project

The cross slope of a paved shoulder of 1.2 m (4 ft) or narrower should match the mainline cross slope. The cross slope of a paved shoulder wider than 1.2 m (4 ft) should match the existing shoulder slope, or should desirably be 4%. An aggregate- or earth-shoulder slope should be 4% to 8%. In a horizontal curve, shoulder slope should be determined in accordance with *Indiana Design Manual* Section 43-3.0.

IV. Shoulder Pavement Section

For a HMA paved shoulder of 1.2 m (4 ft) or narrower, the same HMA thicknesses and pay item designations as those used for the adjacent travel lane should be specified. For a HMA paved shoulder wider than 1.2 m (4 ft), the thicknesses and HMA pay item designations for the appropriate ESAL level identified in revised *Indiana Design Manual* Figures 52-13A through 52-13X should be specified. The metric-units PDF versions of such tables are attached hereto. They include *Manual* headers and footers. Please print them as two-sided pages and replace the like-numbered pages in your copy of the *Manual* with them. The english-units versions are accessible from the Department's website, at www.in.gov/dot/div/contracts/standards/dm/english/ .

For a HMA paved shoulder of 1.2 m (4 ft) or narrower consisting of 360 kg/m² (660 #/yd²) over 150 mm (6 in.) of compacted aggregate, the same HMA pay item designation for the travelway surface course should be specified for the shoulder surface course.

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Attachments

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